

Immunization Strategies for Health Care Practices & Providers

THE NEED TO FOCUS ON STRATEGIES TO INCREASE IMMUNIZATION LEVELS

Vaccine-preventable disease rates are at their lowest level ever. In 2001 there were U.S. reports of only 108 cases of measles, 19 cases of rubella, 2 cases of diphtheria, 27 cases of tetanus, and no wild polio. Given these immunization successes, why is there continued interest in strategies to increase immunization levels? The three chief reasons relate to concerns about current immunization levels, costs, and the sustainability of the immunization delivery system.

Disease levels, while they are one of the chief outcomes of interest, are a late indicator of the soundness of the immunization system. **Immunization levels** are a better indicator than vaccine-preventable disease rates to determine if there is a problem with immunization delivery.

Concerns about U.S. immunization levels include:

Childhood immunization rates are still suboptimal. For example, in 2000 only 82% of children 19 to 35 months of age had received four doses of DTaP vaccine.

For other age groups, immunization rates are considerably lower. Only 64% of people over 65 years of age received the flu vaccine in 2000 and 53% of seniors had ever received pneumococcal vaccine.

Economic and racial disparities exist. Low-income and minority children and adults are at greater risk for under-immunization. "Pockets of need" exist in our nation's inner cities.

Uptake is lagging for some antigens. For example, in 2000 68% of children had received varicella vaccine by their second birthday. Immunization rates in general seem to be lagging for health-care workers. The 1998 National Health Interview Survey results indicate only 37% of health-care workers received influenza vaccine in the previous year.

Improvements in childhood immunization rates have tapered off. In 2000 childhood immunization rates were notably different from those in 1999 only for the varicella vaccine. As we approach our national immunization goals, we will need a clearer understanding of effective immunization strategies.

Cost effectiveness is also of great concern. We need to know which strategies increase immunization levels with the least expenditure so they can be prioritized.

Sustainable systems for vaccinating children, adolescents, and adults must be crafted. It has been recognized that high immunization rates cannot rest upon one-time or short-term efforts.

There is interest in understanding strategies to increase immunization levels in order to create lasting, effective immunization delivery systems.

Matching Strategies to Existing Problems

Many available strategies work to increase immunization, but some do not. The value of a strategy depends upon its implementation, its potential effectiveness, and how well it is matched to existing problems. Some do not work because they are ill-conceived from the beginning. Some strategies do not work because they are implemented badly. Some are simply misdirected - they address the wrong problems.

School entry laws have been shown to effectively increase client demand for vaccines, although the effectiveness of other common strategies (e.g., advertising) is less well documented. Similarly, there are proven strategies well suited to the problem of low access to immunization services (e.g., reducing costs, WIC, home visiting).

When considering what new strategies to implement, we must carefully match proposed solutions to current problems. At present in the U.S., most people have sufficient interest in and access to health care and are seen, at least periodically, in health care systems. Those that remain unvaccinated do so largely because health care practices and providers do not always perform optimally in delivering vaccines. So this chapter focuses on **immunization strategies for health care practices and providers**.

The purpose of the approach discussed below is to move health care personnel from a state of unawareness about the problem (low immunization rates in their practice) to one in which they are aware, concerned, and knowledgeable; motivated to change; ready to try new behaviors (strategies); and capable of sustaining the new behavior.

The acronym used by the National Immunization Program (NIP) for this approach is **AFIX**: **A**ssessment of the immunization coverage of public and private providers; **F**eedback of diagnostic information to improve service delivery; **I**ncentives (or recognition) for improved performance; and **eX**change of information among providers. After discussing each of these steps, the chapter highlights specific practice-based strategies and details where to find more resources on this topic.

THE AFIX APPROACH

Overview

Routine assessment and feedback of vaccination rates obtained at the provider site – whether public or private – is one of the most effective strategies for achieving high, sustainable vaccine coverage. Georgia was the first state to implement AFIX in all public clinics. From 1986 to 1999 median series-completion rates among Georgia's public clinics for 4 DTPs, 3 polio vaccines, and 1 measles-containing vaccine (the 4:3:1 series) at 24 months of age increased from 40% to 91%. In a recent analysis of the Georgia public clinic experience, several factors were found to have significant positive influence on immunization rates: the lead nurse participated in the feedback session after assessments and received an incentive to raise clinic

coverage; the site used a phone system for patient reminders, used WIC voucher incentives, and conducted home visits for children who fell behind in the series.

The Georgia experience is not unique. Other states and localities that have used AFIX strategies for three or more years have shown gradual and consistent improvement in public sector coverage levels. In a private sector study, involving pediatricians, the median up-to-date coverage for 4:3:1 at 24 months of age improved in participating practices from 78% at baseline to 87% at the second assessment. The Together for Tots program, a 10-state effort to improve immunization practices in Community/Migrant Health Centers using continuous quality improvement, saw levels rise from 54% to 84% for 4:3:1 between 1996 and 2000.

AFIX enjoys wide support. One of the Standards of Pediatric Immunization Practices issued by the National Vaccine Advisory Committee (NVAC) calls upon providers to do semi-annual assessments of coverage levels. In 1996, following the success of the Georgia AFIX strategy, a congressional mandate was passed which stated that all grantees receiving federal funds for vaccination programs were required to conduct annual assessments of vaccination rates in all their public health clinics. The Advisory Committee on Immunization Practices (ACIP) issued a statement endorsing the AFIX process and recommending that it be used by all public and private providers. One of the goals in The Healthy People 2010 report emphasizes that 90% of immunization providers should have assessment with feedback. In 1998, the American Academy of Pediatrics (AAP), the American Academy of Family Physicians (AAFP), state health department staff and pharmaceutical company representatives agreed that coverage assessments of private practices using the AAP and AAFP to help gain access was the most effective way of raising and sustaining immunization coverage.

VFC - AFIX Initiative

In order to extend the benefits of AFIX to private providers, which now vaccinate nearly 80% of children in the US, NIP launched an initiative in 2000 to incorporate measurement and feedback activities during Vaccines for Children (VFC) provider site visits. This initiative links AFIX with the VFC program and focuses on increasing vaccine management practices and immunization services within provider offices.

VFC is a federal program that purchases vaccines for eligible children who meet one of the following requirements: qualify for Medicaid, have no insurance, are Native American or Alaska Native, or have insurance but it does not cover immunizations (underinsured). Those children that are underinsured may receive VFC vaccines at Federally Qualified Health Centers (FQHC) or Community/Migrant Health Centers.

All states participate in this popular program, which serves approximately 44,000 provider sites, primarily in the private sector. The VFC program benefits providers as well as children by reducing cost as a barrier and encouraging children to stay in a medical home. VFC provider site visits are conducted to review compliance with VFC eligibility screening requirements and to evaluate vaccine storage and handling procedures. These VFC site visits provide an excellent

opportunity to expand assessment and feedback activities in the private sector.

AFIX has some important characteristics that deserve emphasis.

Focus on outcomes – AFIX starts with assessment. Assessment data helps pinpoint the processes that need to be initiated or remedied. The AFIX approach helps providers focus on specific improvements.

Focus on providers - AFIX focuses on changing health care provider behavior. Strategies implemented do not have to be of a sweeping governmental scope, nor do they need to be attempts to change the hearts and minds of every individual client.

Both personal and technological - AFIX depends on the whole-hearted, intense, and subtle union of technology (in the form of assessment methodology and diagnostics) with art (in the form of persuasive feedback, moving incentives, and stimulating exchange of information). Both the message and its delivery are critical to the success of the AFIX approach. An artful, dynamic delivery can be informative as well as motivational.

Assessment

Assessment refers to the evaluation of medical records to ascertain the immunization rate for a defined group of people as well as to provide targeted diagnosis for improvement. This step, along with feedback of the results, is essential because, while most health care providers share the vision for high immunization rates, they don't see their own practice's immunization rates for what they really are. This lack of awareness has been documented in several studies showing that pediatricians greatly over-estimated the proportion of fully immunized children in their practices. Assessment increases awareness.

The primary assessment tool that CDC offers and supports is the Clinic Assessment Software Application (CASA). In addition to the traditional Classic CASA methods, CDC has created two other assessment options which reduce the amount of time required to conduct an assessment in private provider offices: Mini-CASA and Hybrid CASA. The level of detail desired from the CASA reports will help guide the choice of an assessment method. (See Appendix B for a description of the 3 assessment methods: the Classic CASA, which requires a minimum of 100 records; the Mini-CASA, which requires 50 records; and the Hybrid CASA, which requires 30 records.)

The Classic CASA and the Mini-CASA assessment methods provide detailed reports, which diagnose specific problems. For example, the report results could indicate whether children start their series on time, whether and when patients drop out of the system, whether recall is used effectively, whether vaccines are given simultaneously, and whether record keeping and documentation are adequate. The Hybrid CASA does not offer the same level of detailed reports, though it requires the least amount of time. Depending on the chosen assessment method and the organization of the medical records, the time spent reviewing immunization records and entering

the immunization data into the software program could take between 2 and 8 hours.

CASA is easy to use and can be downloaded from the NIP website (listed in the resource directory) or obtained on disc from NIP. There are many special features, including:

- error-checking to ensure that the immunization dates occurred after the date of birth, before the review date, and after the previous doses;
- capability of capturing useful, non-immunization information by including data fields such as WIC, AFDC, Head Start, EPSDT, HEDIS information, and date of last visit;
- capability of exporting data to other software applications by saving to an ASCII text, dBase file, or an Excel spreadsheet;
- ability to generate a mailing list and a reminder or recall letter/postcard; and
- an easy to use sampling feature that shows the number of records that should be reviewed in order to achieve a statistically relevant estimate of vaccination levels if a fixed number of records, i.e., 100 for Classic CASA, 50 for Mini-CASA, and 30 for Hybrid CASA, is not used.

Feedback

Feedback is the process of informing immunization providers about their performance in delivering one or more vaccines to a defined client population. The work of assessment is of no use unless the results are fed back to people who can make a change. Assessment together with feedback creates the awareness necessary for behavior change.

Strong evidence of the positive effects of provider feedback has been shown in a range of settings (private practice, managed care, public clinics and community health centers, academic, and VA settings), for a range of providers (resident and staff physicians, non-physician providers, internal medicine, family medicine, and general practice), for adults and children (although there are no completed studies to date on adolescents), and for most universally-recommended antigens.

Feed back the data to everyone who can make a change. The data should be presented to the entire team of people who can make a change – not only to policymakers, but also to policy implementers. In a practice, this includes the medical and nursing staff as well as the office manager and receptionist. It is best if they are all presented with the data simultaneously to minimize inter-professional blaming.

Feed back the data with feeling. Feedback is not a pale, passionless out-pouring of data. Well-designed feedback is tantalizing and challenging. The most effective "AFIXers" are those emotionally involved with the "FIX."

Feed back the data with precision. Data should not be sent to the health care providers without explanation or analysis. Within a CASA Summary Report there are data on immunization levels and there are more detailed diagnostic data. Diagnostics isolate a single component of immunization delivery and serve as clues to the source of the systemic problem. They include, for example, data on the percent of patient records that reflect clients who are "lost" (i.e., eligible for vaccine, but not seen in the past year), who were not given all needed vaccines simultaneously on the last vaccination visit, or who "dropped-out" of the immunization schedule. (For more information on CASA reports, see ["How to Read a CASA Summary Report: Just for Starters"](#) in Appendix B.)

Because of the diagnostic capabilities of CASA, one does not need to "fish around," asking a practice if they implement this strategy or that. For example, a practice with a 50% drop-off rate need not be asked if they have an effective recall system. We know by the data what the office is (not) doing or how (in)effectively they are doing it. Once you have established the accuracy of the method, the only issue that remains to be discussed is how to best improve those specific areas that are below the norm.

Feed back the data as data, not as judgment. There are no bad people, only bad systems. That is, the problem is not the individuals employed at the site, it is their immunization delivery system. You need not scold the people, just help them improve the system.

Feed back the data with respect for confidentiality. The acceptance of an outside assessor depends upon trust that the data will be used in a pre-arranged, circumscribed way. Don't violate that trust.

Feed back the data as a challenge. The over-riding dedication to confidentiality should never be compromised. However, in some circumstances, offices agree to allow their data to be used publicly, either in association with their name or not. By comparing an office's immunization rates with national goals or, preferably, with the rates of peers, competitive spirit can be stirred. Those at the top struggle to keep or attain first place; those at the bottom scramble to avoid last place. Graphic representation of relative standing – such as comparing providers anonymously – is useful, as is wide public dissemination of the assessment results, when appropriate.

Incentives and Recognition

People who enter the health care profession are likely to be motivated by an intrinsic desire to prevent disease and its complications. Immunization is primarily dependent upon this intrinsic motivation. However, as a supplement, extrinsic rewards, or incentives, are often useful. It should be noted that incentives will not overcome significant barriers (e.g., if your practice loses \$15 every time you vaccinate someone, framed certificates of appreciation are unlikely to sway you to immunize).

An *incentive* is something that incites or has a tendency to incite to determination or action. This necessitates pre-arranged performance standards ("if I do X, I will get Y"). *Recognition* is

special notice or attention, and is a powerful motivator. Pre-arranged performance standards are not necessary for recognition. When a recognition program has been in place for a while, people begin to expect it, so it becomes, in a sense, an incentive program.

What makes an incentive useful? Incentive programs should:

- Reward achievement on the basis of a **fair, credible, well-communicated assessment**.
- **Be positive**; the motivating effect of carrots exceeds the motivating effect of sticks.
- Reward achievement in a **timely** fashion.
- Offer **something the individual values**. Not everyone values the same things, so discuss the incentives in advance of kick-off. Don't forget that professional recognition is often motivating. Food is (almost) always motivating. Money is 'iffy': it may be motivating, but it may be insulting or encourage cheating.
- **Be aimed to all levels of involved personnel** (e.g., clerical and nursing staff).
- **Create team spirit** and/or utilize the competitive nature of Americans.
- **Be publicized**. Don't let their light stay under the bushel basket: Let it shine. When a professional shares his/her success story with another professional, you make two friends. Having it in writing seems quite powerful.
- **Reward achievement of attainable goals**. Incremental goals help; complicated goals don't.
- **Reflect desired outcomes** (e.g., immunization rates) or process (e.g., putting a reminder system in place) or both. "Most improved" is a useful category to keep everyone in the running.
- **Be inexpensive** because these are usually more sustainable.
- **Be related to mission** (e.g., the reward for letting us do a CASA is that at the end we'll give you a list of children at your practice who are behind on immunizations).
- **Create a bond** between the public and private sectors (e.g., the prize for letting us do an assessment is that at the end we'll call the children at your practice who are behind on immunizations).
- NOT dictate methods. Leave the innovation about "how to" up to the practice. Of course, you can be there as a resource if they have questions or want suggestions.
- NOT be stale ("Been there, won that.")

- NOT reward winners with more unwelcome work.

The costs of an incentive program may be shared with other immunization and/or community partners. Various organizations and private enterprises are available to help fund creative incentive ideas. For example, local professional organizations may allocate space in their newsletter to acknowledge immunization accomplishments. Businesses, service organizations, or vaccine manufacturers may wish to donate food, gifts, gift certificates, and/or plaques for an awards luncheon or banquet. A well-known public official or immunization advocate may be willing to hand out achievement awards at a meeting. Finally, continuing education credit could be offered at meetings at which the assessment program is discussed.

eXchange of Information

When health care providers have moved from being unaware of their site's low immunization rates to being aware, concerned, and knowledgeable as well as motivated to change, they are then ready to try new strategies. The exchange of information among health care providers is an important next step because peer-education is the best way to learn what new strategies to try.

Why should the exchange of information among providers be supported? Discussion with fellow workers or education from peers seems to help most adults learn new things, or recognize they need to stop doing old things. This exchange helps to educate, motivate, and coordinate in a way that is powerful because it is believable and relevant.

- **Education.** The exchange of information gives people access to more experience than they have time to accumulate individually. People learn from their peers what strategies work and what strategies don't. The educational aspect of these conversations can dispel myths and negative attitudes (e.g., inflated coverage estimates, the number of shots that parents will accept), clarify true contraindications, and foster better understanding of assessment data as a diagnostic tool. During the cross-pollination some new ideas may even be generated.
- **Motivation.** By publicly acknowledging success, providers are informed of the shifting norm. This stimulates competition and motivates improvement which, in turn, establishes the need for follow-up assessments. The exchange of information about practices' relative immunization rates is an incentive to change.
- **Coordination.** Once the participants' common mission to prevent disease has been clarified, people may begin to see how they can use and share common resources, improve communication within and between practices, and, possibly even coordinate with the registry and public health department. Increased communication often leads to improved rapport.

What forums are appropriate for exchange among providers? Meetings of health care providers may be state-wide, regional, or local. They may be convened solely with the practice members - physicians, nurses, office managers, and clerical staff - or with sections of professional organi-

zations such as the American Academy of Pediatrics, American Academy of Family Physicians, American Nursing Association, or the Public Health Association. Meetings of health care providers within a managed care plan are another excellent setting for this kind of exchange. Award ceremonies serve as a particularly pleasant and supportive forum to open the exchange.

What type of information should be exchanged among providers? Information on both immunization levels and on the process of increasing immunization levels should be exchanged. Sharing information on immunization levels - whether that is limited (e.g., coverage levels, rank ordered by the type of service to increase comparability if possible) or more extensive (e.g., specific antigen coverage levels, drop off levels, non-simultaneous vaccination levels) - will keep the group focused on the desired end-point. Data can be presented as blinded coverage levels or comparing a provider's rates to an anonymous average or an anonymous bar graph of other provider coverage rates. Sharing data on the process of getting there will confirm that providers are establishing sustainable systems. If awards are given, a category for "most improved" keeps even late bloomers in the running.

Peer reports are usually more influential than official reports. Peer reports on their successful documentation methods, vaccination practices, and office protocols are often interesting. Discussions of processes used in practices to educate staff and to streamline procedures are also useful. Information on true vaccine contraindications, ACIP recommendations, and the Pediatric Standards should supplement peer reports, but they are often too dry to stand alone. Testimonial success stories are useful to show that, while we all start out flawed, immunization redemption is an attainable goal. Indeed, almost all practices can be made better by better practices.

BETTER PRACTICES

What are the strategies that lead to high immunization levels in a practice? In this section we will discuss well-studied strategies that are applicable within most public and private sector practices. Additionally, we will discuss some strategies that simply enjoy tremendous intuitive appeal (e.g., good immunization records). The strategies are summarized under the following headings:

- Records that are accurate, understandable, and available
- Recommendations to parents and reinforcement of the need to return
- Reminder and recall messages to patients
- Reminder and recall messages to providers
- Reduction of missed opportunities
- Reduction of barriers to immunization within the practice

It has been noted anecdotally that many health care practices that successfully implement these strategies do so because there is an Immunization Champion among them. Motivation courses through the arteries and veins of Immunization Champions. Thus it is that they find a way.

Records That are Accurate, Understandable, and Available

Easy-to-read immunization records that are available at the time of the visit are essential. Adult medical records often lack a front sheet that reflects the important preventive services. Pediatric patients often have a front sheet from which one cannot, at a glance, assess age-dependent immunization status. Putting in place a system that ensures the front sheet is kept current also helps.

Immunization records must be accurate. The active medical records must reflect who is actually in the practice. Charts of people who have moved or are going elsewhere for services should be clearly marked accordingly or removed. Conversely, charts should not be archived simply because a patient has not presented for a prolonged time.

Patients often receive vaccines at more than one provider office, so communication between sites is needed to produce complete and accurate immunization records. Specifically, it is important for school-based, public health, and community-based immunization sites to communicate with primary care personnel through quick and reliable methods (e.g., telephone, fax, and, if possible, email). Someday immunization registries may make this communication seamless. We should work toward, but not wait for, this day to implement efficient communication between vaccine providers. Unfortunately, the effectiveness of patient-held records on immunization rates is difficult to estimate because of the small number of studies, limitations in study design, and inconsistent results.

Recommendations to Parents and Reinforcement of the Need to Return

The recommendation of a health care provider is a powerful motivator. One study demonstrated that when the health care provider's opinion of influenza vaccine was positive, even adults whose initial opinion of influenza vaccination was negative were likely to receive the vaccine. Similarly, other work has shown that parents of pediatric patients are very likely to follow vaccine recommendation of the child's doctor.

It has been found that, irrespective of true immunization status, most parents believe their child is fully vaccinated. Parents may not have been told or may not have understood that return visits were necessary. Anecdotally, patients often find it useful to have the next appointment date in hand upon departure from the current visit. As a supplement to this, the timing of the return visit can be linked to some calendar event (e.g., "Return for your next flu vaccine in a year, right before Halloween." "Your child will need her next set of vaccines in two months. That's her 6-month birthday . . . right after Valentine's day.")

Reminder and Recall Messages to Patients

Definitions. Patient reminders and recall messages are messages to patients or their parents that recommended immunizations are due soon (reminders) or past due (recall). The messages vary in their level of personalization and specificity and in their medium (e.g., postcard, letter, telephone) and their degree of automatization.

The effectiveness of patient reminders and recall. Both reminders and recall have been found to be effective in increasing attendance at clinics and improving vaccination rates in various settings. This is probably because multiple health care visits usually are needed for patients to be fully vaccinated and these visits are sometimes missed. Clients can be quite variable in their attendance for vaccination appointments.

Over the past 20 years, many studies of the effectiveness of mail or telephone appointment reminders/recall have shown consistently important increases in patient compliance for vaccination as well as a variety of other scheduled health visits. Generally, mail and telephone reminders are equally effective.

Costs. Many health providers have been reluctant to institute aggressive reminder/recall systems because of perceived costs. Tracking systems that generate reminder and recall messages do not have to be expensive, elaborate, or computerized. A card-file box with weekly dividers can work as a tickler system.

In many provider settings, the costs of establishing an aggressive notification system may be minimized by the use of automated dialing technology (autodialers). In a recent study conducted by CDC NIP and the Colorado Immunization Program, computer-generated telephone calls and letters resulted in a 14% increase in immunization coverage at a cost of \$5.37 per child after start-up.

Support for and wide-spread usage of patient reminders and recall. One of the Standards for Pediatric Immunization Practices calls upon providers to develop and implement aggressive tracking systems that will both remind parents of upcoming immunizations and recall children who are overdue. The Advisory Committee on Immunization Practices supports the use of reminder/recall systems by all providers. CDC NIP has provided state and local health departments with ongoing technical support to assist them in implementing reminder and recall systems in public and private provider sites.

Immunization and beyond: additional benefits of patient recall and reminder systems. Three trials conducted by CDC NIP and the Georgia Department of Human Resources have demonstrated that computer-generated telephone reminders and recall messages, in addition to positively affecting the "on-time" rate of immunizations, bring a significant number of children who have dropped out back into the public health delivery system. Studies in the private sector show that a key benefit of patient reminder/recall systems is that they increase utilization of other preventive measures. This is very exciting: we are not improving one preventive measure at a cost to the others. When we institute patient reminder and recall systems for immunization, we increase tuberculosis, lead, and anemia screening. Improvements in a system, like most vaccine-preventable diseases, are contagious.

Reminder and Recall Messages to Providers

Provider reminders and recall messages are communications from health care personnel (or computers) to health care providers that, for individual clients, routine immunizations are due soon (reminders) or past due (recall). Provider reminder/recall is different from "Feedback" in which the provider receives a message about overall immunization levels for a group of clients. Examples of reminder/recall messages include:

- a computer-generated list that notifies a provider of the children past-due for vaccines who are to be seen that clinic session,
- a red note "No Pneumococcal Vaccine on Record" that a receptionist stamps on a senior's chart where the nurse will write the vital signs,
- an "Immunization Due" clip that a nurse attaches to the chart of an adolescent who has not had hepatitis B vaccine.

The content of the provider reminders and recall messages vary as do the techniques to deliver them. To be effective, the information must be conveyed to the provider before or at the time of the patient's office visit. Some offices have found that it is productive to have one knowledgeable and determined "gate keeper" who checks and updates immunizations at each visit.

Provider reminders and recall systems have been found to be effective in increasing immunization levels when used alone or in combination with related strategies such as provider education or patient recall.

Reduction of Missed Opportunities to Vaccinate

Definitions. A missed opportunity is a health care encounter in which a person is eligible to receive a vaccination, but is not vaccinated completely. Missed opportunities occur in settings that routinely offer immunization, such as primary care offices or public health clinics, and settings that do not routinely offer immunizations including health care settings, e.g., emergency departments, inpatient wards) and public health settings (e.g., WIC program sites).

Why are there missed opportunities to vaccinate? Many nurses and physicians avoid simultaneous administration of four or even three injectable vaccines. Frequently stated reasons for resistance to simultaneous administration have included concern about reduced immune response, adverse events, and parental objection. These sources of resistance are not supported by scientific data. Providers also may be unaware that a child is in need of vaccination (especially if the immunization record is not available at the visit), may follow invalid contraindications (see Chapter 2 for more information), or may avoid use of the accelerated schedule. The accelerated schedule is especially important early in the series in order to assure that the six-month minimum interval between DTaP3 and DTaP4 has elapsed in time to allow

DTaP4 to be given simultaneously with vaccines required after 12 months of age (especially MMR).

Some of the reasons for missed opportunities relate to larger systems - e.g., a clinic that has a policy not to vaccinate at any visits except well child care, or not to vaccinate siblings. And some of the reasons relate to very large systems, like state insurance laws that deny reimbursement if a vaccine is given during an acute visit. The degree of difficulty in eliminating the missed opportunity may vary directly with the size of the system that has to be changed.

Strategies to rid practices of missed opportunities. Several studies have shown that eliminating missed opportunities could increase coverage by up to 20 percent. Strategies designed to rid practices of missed opportunities have included several modalities alone or in combination. Examples include:

- **Standing orders** – These are interventions in which non-physician immunization personnel vaccinate clients by protocol without direct physician involvement at the time of the immunization. This may occur in a variety of settings such as clinics, hospitals, and nursing homes. When used alone or in combination with other interventions, standing orders have had positive effects among adults in a range of settings.
- **Provider education** – Giving immunization providers information has been attempted with written materials, videos, lectures, and computerized software. Providing only knowledge may have limited impact on provider behavior, while implementing multi-component interventions that incorporate both knowledge and other strategies (e.g., feedback, incentives) show more convincing evidence of effectiveness.
- **Provider reminder/recall systems** – These are discussed above. While provider reminder/recall systems generally work to increase immunization levels, they may not be effective in decreasing missed opportunities if they are implemented in an inconsistent way or if providers strongly adhere to invalid contraindications.

Reduction of Barriers to Immunization Within the Practice

Time and space are two of the chief characteristics of the physical universe. They are also two of the chief barriers to vaccination. Thus, attempts have been made to decrease the distance people must travel or the time they must spend to get vaccinated. Expanding hours or access in clinical settings is one example of this approach. Although data are insufficient to support such an intervention by itself, strong evidence exists that this intervention is a valuable component of a multi-component intervention.

Psychological barriers to health care are often more subtle, but may be just as important. Unpleasant experiences (e.g., fear of immunizations, being scolded for previously missed appointments, difficulties leaving work for a clinic appointment) may lead clients to procrastinate about receiving needed vaccination. Health care practices should provide a supportive and safe atmosphere for clients.

SUMMARY

Immunization delivery systems must be improved for people in all age groups, and especially for the poor and minorities. Strong evidence exists that this improvement can be achieved through practice-based assessment of immunization rates and feedback of those rates to all the people involved. The use of incentives - even if they are simple recognition of a good job - are useful for enhancing motivation. The exchange of information among providers is useful for maintaining motivation, as well as for aiding education and coordination. The facilitators of this exchange should encourage discussion of immunization levels, but also of the system changes that lead to improved immunization levels.

We have to get out the word that we have strong evidence about what system changes are needed. We have to get out the word that there are benefits beyond increased immunization rates; these system changes can lead to improvement in a wide range of clinical prevention services. And we need to find (or become) the prevention Champions who will lead the work of improving immunization records, recommending vaccines, creating aggressive reminder and recall systems, and ridding practices of immunization missed opportunities and barriers. We know we can do it and our children and our parents deserve it.

THE GUIDE TO COMMUNITY PREVENTIVE SERVICES

This chapter has benefitted considerably from the Guide to Community Preventive Services, the definitive, evidence-based source on strategies to increase immunization levels. The Guide, developed under the auspices of the U.S. Public Health Service, summarizes data on the effectiveness and, when possible, the cost-effectiveness of population-based interventions for prevention and control. The Guide provides recommendations on these population-based interventions and methods for their delivery. The Guide's chapter on vaccine preventable disease provides information about a wider range of strategies to improve coverage than are included here and provides more of the evidence on which some of the conclusions in this chapter are based.

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